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**Rock Pocket Mouse Evolution Activity**

Mrs. Krouse, AP Biology, 2015-2016

*\*\*\*This activity is modified slightly from one developed by HHMI\*\*\**

**Introduction:**

A typical rock pocket mouse is about 170 millimeters long from nose to rump, shorter than an average pencil. And at just 15 grams, this tiny mouse weighs about as much as a handful of paper clips. Rock pocket mice, however, have had an enormous impact on science. What’s so special about them?

You can find populations of rock pocket mice all over the Sonoran Desert in the southwestern United States. There are two common varieties—a light-colored variety and a dark-colored variety. There are also two major colors of substrate, or surface materials, that make up the desert floor. Most of the landscape consists of light-colored sand and rock, but patches of dark volcanic rocks that formed from cooling lava flows are found, separated by several kilometers of light-colored substrate.

**Directions:**

The illustrations provided to your research team represent snapshots of rock pocket mouse populations. Each full-page illustration shows the color variation at two different locations, A and B, at a particular moment in time. (Note: The images are out of order.)

1. Count the number of light-colored and dark-colored mice present at each location at each moment in time. Record your counts in the spaces provided at the top of each illustration.

2. Place the illustrations in what you think is the correct order from oldest to most recent. Indicate your order by circling the appropriate number under the illustration.

3. Explain how you chose to order the illustrations. Provide evidence from the illustrations at both Location A and Location B to support your explanation.

Watch the Howard Hughes Medical Institute’s short film *The Making of the Fittest: Natural Selection and Adaptation*. As you watch, look for an explanation for the differences among the illustrations that will help you confirm that the order in which you arranged the illustrations is correct. Think about the following questions when you are watching the video, and answer them with your research teams afterwards.

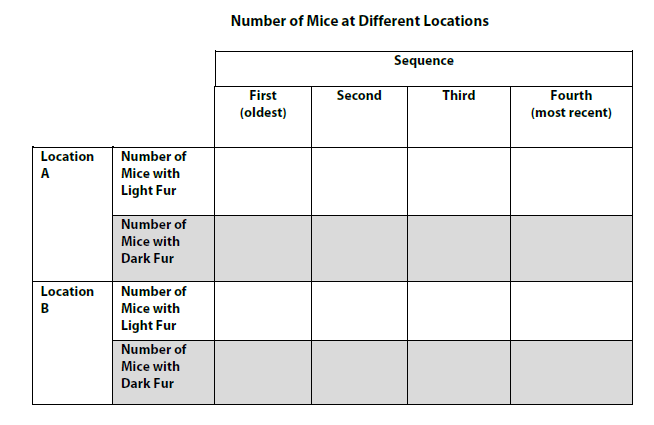
4. If a population starts with all light colored mice, explain how a dark colored mouse can appear.

5. Justify the following claim using the rock pocket mice as an example: A mutation can be either beneficial or harmful depending on the environment. (Note: A mutation can also be neutral, but you do not need to discuss this here.)

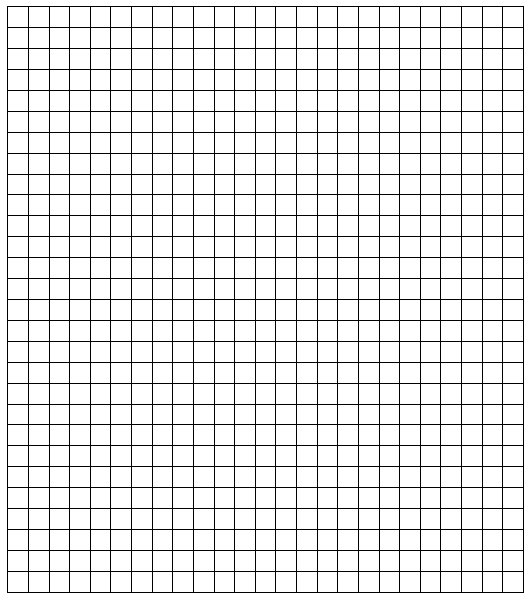
6. Explain how natural selection occurred in the rock pocket mice at Location B. Use the terms “selection pressure” (i.e. something in the environment that causes evolution of a particular trait) and “fitness” in your response.

7. Explain the meaning of the following claim: Mutation is random, but natural selection is not.

8. Using what you learned by watching the film, check the order in which you arranged the illustrations. Change the order as necessary. Once you are satisfied that you are correct, fill out the data table below using the counts you recorded above the illustrations.



9. Create a bar graph that shows the amount of mice of each fur color at **Location A** at times 1,2,3, and 4. Make sure to include a title that describes the variables on both axes. The X axis should have a label and represent times 1,2,3, and 4. The Y axis should be labeled “number of mice” (of a particular color). Therefore, at each time, you will have two bars—one showing the number of light mice and one showing the number of dark mice at that point in time. Make your light vs. dark bars distinguishable from one another and create a key to help the viewer determine which bar is which.



10. Create a bar graph that shows the amount of mice of each fur color at **Location B** at times 1,2,3, and 4. Make sure to include a title that describes the variables on both axes. The X axis should have a label and represent times 1,2,3, and 4. The Y axis should be labeled “number of mice” (of a particular color). Therefore, at each time, you will have two bars—one showing the number of light mice and one showing the number of dark mice at that point in time. Make your light vs. dark bars distinguishable from one another and create a key to help the viewer determine which bar is which.

